



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,596	09/25/2006	Susumu Noda	46311.1	1380

66416 7590 04/16/2008
JAPAN SCIENCE AND TECHNOLOGY AGENCY
c/o KEATING & BENNETT, LLP
8180 GREENSBORO DRIVE
SUITE 850
MCLEAN, VA 22102

EXAMINER

BELOUSOV, ALEXANDER

ART UNIT	PAPER NUMBER
----------	--------------

2811

MAIL DATE	DELIVERY MODE
-----------	---------------

04/16/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,596	Applicant(s) NODA ET AL.	
	Examiner ALEXANDER BELOUSOV	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6 and 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>09/23/2005, 11/06/2006 & 03/07/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election **without traverse** of claims 1, 2, 4-6 & 8 in the reply filed on 02/06/2008 is acknowledged. **Claim(s) 3 & 7** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group. Election was made **without traverse** in the reply filed on 02/06/2008.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 09/23/2005, 11/06/2006 & 03/07/2007. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim(s) 4 & 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim limitations of "made of two or more media", as recited in claim(s) 4 & 8, are unclear as to whether "media" in claims 4 & 8 is same or different from "media" in claims 1 & 5.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior

Art Unit: 2811

art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claim(s) 1, 2, 4-6 & 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over (US-5617445) by Jewell.

Regarding claims 1, Jewell discloses in FIG. 2K and related text a two-dimensional photonic crystal surface-emitting laser comprising a photonic crystal which has a photonic crystal periodic structure (column 3, lines 30-35; column 2, lines 30-50; and column 7, lines 40-45) located in or near an active layer (FIG. 1A, 18; FIG. 4, 18) which emits light when carriers are injected thereto, said photonic crystal periodic structure having media with different refractive indices (see column 7, lines 40-60; especially, “refractive index of the **composite** medium” and its definition; hence, “**different** refractive indices” and “in or **near** active layer”) in two-dimensional periodic array (FIG. 2K), wherein: said photonic crystal periodic structure has translation symmetry but does not have rotation symmetry (FIG. 2K has translation but not rotation symmetry).

Jewell does not explicitly state in FIG. 2K and related text a said photonic crystal periodic structure *is of a square lattice structure or a rectangular lattice structure* (the FIG. 2K is a “centered rectangular lattice”).

Jewell discloses in FIG. 2C and related text a said photonic crystal periodic structure is of a square lattice structure or a rectangular lattice structure (84).

The instant invention appears to be merely a combination of prior art elements (the device of FIG. 2K and the lattice structure of FIG. 2C) according to known methods (Jewell's methods of making the device) to yield predictable results (a surface-emitting laser; also see, column 7, lines 23-26; FIG. 2K and 2C teach two lattice structures out of multitude disclosed by

Art Unit: 2811

Jewell, all serving similar functions and therefore Jewell gives a strong suggestion for substitution, a clear expectation of success and that device would function in same manner with either structure), which is considered to be obvious to one of ordinary skill in the art (KSR International Co. v. Teleflex Inc., 550 U.S.-, 82 USPQ2d 1385).

Regarding claim 5, Jewell discloses in FIG. 2K and related text a two-dimensional photonic crystal surface-emitting laser comprising a photonic crystal which has a photonic crystal periodic structure (column 3, lines 30-35; column 2, lines 30-50; and column 7, lines 40-45) located in or near an active layer (FIG. 1A, 18; FIG. 4, 18) which emits light when carriers are injected thereto, said photonic crystal periodic structure having media with different refractive indices (see column 7, lines 40-60; especially, “refractive index of the **composite medium**” and its definition; hence, “media with different refractive indices”) in two-dimensional periodic array (FIG. 2K).

Jewell does not explicitly state in FIG. 2K and related text said photonic crystal periodic structure *is of a square lattice structure or a rectangular lattice structure which is classified into p1, pm, pg or cm by a classification method under IUC (International Union of Crystallography in 1952).*

Jewell discloses in FIG. 2C and related text said photonic crystal periodic structure is of a square lattice structure (84) or a rectangular lattice structure which is classified into p1, pm, pg or cm by a classification method under IUC (International Union of Crystallography in 1952) (inherently a “p1, pm, pg or cm” lattice structure by Applicant’s admission; on pages 17 & 18 of the specification Applicant admits that the lattice structure of the type described by Jewell in FIG. 2C is a p1, pm, pg or cm lattice structure).

The instant invention appears to be merely a combination of prior art elements (the device of FIG. 2K and the square lattice structure of FIG. 2C) according to known methods (Jewell's methods of making the device) to yield predictable results (a surface-emitting laser; also see, column 7, lines 23-26; FIG. 2K and 2C teach two lattice structures out of multitude disclosed by Jewell, all serving similar functions and therefore Jewell gives a strong suggestion for substitution, a clear expectation of success and that device would function in same manner with either structure), which is considered to be obvious to one of ordinary skill in the art (KSR International Co. v. Teleflex Inc., 550 U.S.-, 82 USPQ2d 1385).

In short, FIG. 2C and 2K

Regarding claims 2 & 6, does not explicitly state in FIG. 2K and related text the photonic crystal comprises substantially triangular lattice points.

Jewell discloses in FIG. 2A and related text the photonic crystal comprises substantially triangular lattice points (72).

The Applicant appears to have merely combined prior art elements (the device of FIG. 2K and the lattice structure of FIG. 2A) according to known methods (Jewell's methods of making the device) to yield predictable results (a surface-emitting laser; also see, column 7, lines 23-26; FIG. 2K and 2A teach two types of lattice points out of multitude disclosed by Jewell, all serving similar functions and therefore Jewell gives a strong suggestion for substitution, a clear expectation of success and that device would function in same manner with either structure), which is considered to be obvious to one of ordinary skill in the art (KSR International Co. v. Teleflex Inc., 550 U.S.-, 82 USPQ2d 1385).

Art Unit: 2811

Regarding claims 4 & 8, Jewell discloses in FIG. 2K and related text the photonic crystal comprises lattice points each of which is made of two or more media with different refractive indices or each of which is made of a medium with a refractive index distribution (see column 7, lines 40-60; especially, “refractive index of the **composite** medium” and its definition; hence, “two or more media with different refractive indices”).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Belousov whose telephone number is 571-270-3209. The examiner can normally be reached on Monday - Thursday 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander Belousov/
Examiner, Art Unit 2811
04/05/2008

/Ori Nadav/
Primary Examiner, Art Unit 2811